Claims

1. A variable focal length projection objective, preferably serving to image tilting mirror matrices or reflecting and/or transmitting LCDs, said projection objective comprising a first group of lenses, a second group of lenses and a third group of lenses arranged on a common optical axis, wherein, starting from a side facing a projection screen, the first group of lenses, serving the purpose of focussing, and the second group of lenses, serving the purpose of varying the focal length, are variably positionable on the optical axis, and the third group of lenses is stationary on the optical axis, wherein:

$$1.0 \text{ h max} < \text{dG2-G3} < 1.5 \text{ h max}$$

and

$$s \leq 10 \text{ mm},$$

wherein h max is a maximum object height, dG2-G3 is distance between the second group of lenses and the third group of lenses in a first position, and s is the distance from a back vertex of the third group of lenses to an object.

2. The projection objective as claimed in Claim 1, wherein:

$$1.2 \text{ fl} < \text{fG1} < 1.7 \text{ fl},$$

wherein fl is the total focal length of the objective in a first position and fG1 is the absolute value of the focal length of the first group of lenses.

3. The projection objective as claimed in Claim 1, wherein:

$$0.7 \text{ fl} < \text{fG2} < 1.1 \text{ fl},$$

wherein fl is the total focal length of the objective in a first position and fG2 is the absolute value of the focal length of the second group of lenses.

4. The projection objective as claimed in Claim 1, wherein:

$$1.5\ fl < fG3 < 2.0\ fl,$$

wherein fl is the total focal length of the objective in a first position and fG3 is the absolute value of the focal length of the third group of lenses.

5. The projection objective as claimed in Claim 1, wherein, starting from the side facing the projection screen:

the first group of lenses consists of a negative meniscus, a positive meniscus and a negative lens,

the second group of lenses consists of a negative meniscus or of a negative assembly consisting of a positive meniscus and a negative meniscus; of a positive lens and of a positive assembly consisting of a positive lens and a negative lens, and

the third group of lenses comprises at least one positive lens.

6. The projection objective as claimed in Claim 2, wherein, starting from the side facing the projection screen:

the first group of lenses consists of a negative meniscus, a positive meniscus and a negative lens,

the second group of lenses consists of a negative meniscus or of a negative assembly consisting of a positive meniscus and a negative meniscus; of a positive lens and of a positive assembly consisting of a positive lens and a negative lens, and

the third group of lenses comprises at least one positive lens.

7. The projection objective as claimed in Claim 3, wherein, starting from the side facing the projection screen:

the first group of lenses consists of a negative meniscus, a positive meniscus and a negative lens,

the second group of lenses consists of a negative meniscus or of a negative assembly consisting of a positive meniscus and a negative meniscus; of a positive lens and of a positive assembly consisting of a positive lens and a negative lens, and

the third group of lenses comprises at least one positive lens.

8. The projection objective as claimed in Claim 4, wherein, starting from the side facing the projection screen:

the first group of lenses consists of a negative meniscus, a positive meniscus and a negative lens,

the second group of lenses consists of a negative meniscus or of a negative assembly consisting of a positive meniscus and a negative meniscus;

of a positive lens and of a positive assembly consisting of a positive lens and a negative lens, and

the third group of lenses comprises at least one positive lens.

9. The projection objective as claimed in Claim 1, wherein:

$$2.0 < L / fl < 3.0,$$

wherein fl is the total focal length of the objective in a first position and L is the entire length of the objective.

10. The projection objective as claimed in Claim 5, wherein:

$$2.0 < L / fl < 3.0,$$

wherein fl is the total focal length of the objective in a first position and L is the entire length of the objective.

11. The projection objective as claimed in Claim 1, wherein:

$$1.68 < navg < 1.74,$$

wherein navg is the average refractive index of the objective.

12. The projection objective as claimed in Claim 5, wherein:

$$1.68 < navg < 1.74,$$

wherein navg is the average refractive index of the objective.

13. The projection objective as claimed in Claim 1, wherein:

$$40.0 < vavg < 44.0,$$

wherein vavg is the average value of the Abbe dispersion number of the objective.

14. The projection objective as claimed in Claim 5, wherein:

$$40.0 < \text{vavg} < 44.0,$$

wherein vavg is the average value of the Abbe dispersion number of the objective.